



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2021; 10(12): 960-962  
© 2021 TPI  
[www.thepharmajournal.com](http://www.thepharmajournal.com)  
Received: 04-09-2021  
Accepted: 09-10-2021

**Ashwini Uikey**  
Research Scholar, Fruit science,  
Department of Horticulture,  
RVSKVV, Gwalior, Madhya  
Pradesh, India

**PKS Gurjar**  
Senior Scientist, KVK Morena,  
RVSKVV, Gwalior, Madhya  
Pradesh, India

**Bhanuja Dwivedi**  
Research Scholar, Vegetable  
science, Department of  
Horticulture, RVSKVV,  
Gwalior, Madhya Pradesh, India

## Studies on physico-chemical evaluation of various aonla (*Emblica officinalis* L.) fruits from the Gird region of Madhya Pradesh, India

Ashwini Uikey, PKS Gurjar and Bhanuja Dwivedi

### Abstract

Aonla (*Emblica officinalis* L.) is an important fruit crop indigenous to Indian sub-continent, which can be grown successfully in dry and neglected regions. The farmers are trying different varieties for growing as a commercial orchard without having knowledge about the performance of these varieties. The observations were recorded for physio-chemical characters of dropped aonla fruits in fresh condition. The experiment on varietal evaluation of the physico-chemical characteristics of various cultivars of aonla viz., NA-4, NA-5, NA-6, NA-7, NA-10, Laxmi and Chakaiya were taken up under the Gird regions of Madhya Pradesh at Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior during the year 2019-20 and 2020-21. Maximum fruit length (3.91cm) was recorded with the variety NA-10 followed by NA-4 and NA-7. These varieties have also higher productivity and fruits are free from necrosis or internal browning, hence, they are considered to be ideal varieties for processing.

**Keywords:** Aonla, Physico-chemical, gird regions, processing

### Introduction

Aonla is one of the oldest minor fruit and considered to be a wonder for human health. India ranks 1<sup>st</sup> in aonla area and production all over the world. It belongs to the family Euphorbiaceae and comprises about 350 pieces. Mostly, it is popular in Uttar Pradesh but, nowadays its area is expanding rapidly in many states such as Maharashtra, Gujarat, Rajasthan, Andhra Pradesh, Karnataka, Tamil Nadu, Himachal Pradesh etc. It is one of the unique fruit which got great commercial importance because of its high antioxidant and medicinal properties and it is considered as “Wonder fruit for health” because of its unique qualities.

Area and production of aonla has increased from 67,000 hectares to 1,08,000 hectares according to the world wide record. In India, aonla is grown in area of about 50,000 hectares with a production of around 200000 metric tonnes. The area under aonla has been expanding rapidly in the last couple of years.

The main cultivated varieties are Banarasi (Drying), Bansi Red, Chakaiya (Pickle, Candy and Syrup), Desi, Krishna/NA-5(Candy and jam), Kanchan/NA-4 (Candy and Jam), Franchis (Hathijhool), NA-6, NA-7(Candy and Jam), NA-8, NA-9, NA-10 and Anand-7(Pickle). The aonla gets ready for harvesting during mid-November to first week of January. However, the fruit may be allowed to remain on the tree till February without much fruit drops. The optimum stage of harvesting falls between the periods extending from the second week of December to the third week of January in Northern plains.

### Material and Methods

The studies were carried out at main experimental station of Department of Horticulture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior. During the year 2019-20 and 2020-21. The research work was undertaken as per details given below. The varieties studied are NA-4, NA-5, NA-6, NA-7, NA-10, Laxmi and Chakaiya. The samples were collected from 12 years old aonla orchard planted under sodic soil condition and it is located in typical saline-alkaline belt of indigenous plains and Gird regions of Madhya Pradesh.

### Physical Character Analysis

Harvesting of 10 kg fruits per varieties with uniform size and age were selected at random for analysis. The fruit weight (g), fruit length (cm), fruit diameter (cm), flesh content (%) and seed content (%) were recorded. The size of the fruit was measured by the Vernier Callipers.

**Corresponding Author:**  
**Ashwini Uikey**  
Research Scholar, Fruit science,  
Department of Horticulture,  
RVSKVV, Gwalior, Madhya  
Pradesh, India

Weight of fruit was recorded using an electronic balance.

### Chemical characters of the fruits

Ten fruits were selected randomly among the dropped fruits and estimations were done in laboratory. T.S.S. was recorded using Hand Refractometer of each cultivar. The acidity content was determined by titrating the sample extracted in water against 0.1 N sodium hydroxide. The ascorbic acid content was estimated by 2,6 dichlorophenol indophenols titration method by Ranganna (1986) and expressed in terms of milligrams per hundred grams of fruit. Ascorbic acid was calculated using the formula.

$$\text{Titre value} \times \text{dye factor} \times \text{volume made up ascorbic acid (mg/100g)} = \frac{\text{-----}}{\text{aliquot of extract taken} \times \text{Volume of sample}} \times 100$$

The fibre extracted is weighed on the electronic chemical balance and recorded. The colour of the fruits was observed visually on each date of the observation for all the cultivars.

### Statistical analysis

The experimental values were analyzed statistically by using completely randomized block design (CRD) with three

replications of each cultivar. Means were compared using WASP (Web Agri STAT Package ICAR Research Complex, Goa) test at 5 % level of significance.

## Results and Discussion

### Physical parameters VARIETY

The perusal of the data presented in Table- 1 indicated that the cultivars expressed their yield potentially at different magnitude in the present agro-climatic situation. In this study, seven different varieties were assessed for their physical characteristics. The fruit colour of all the varieties yellowish green except of Desi variety, which was green in colour (Table 1). Shape of the varieties was round to oblate. The maximum fruit weight was observed in variety NA-5 followed by NA-4 whereas the smallest fruit weight was of NA-10 followed by NA- 6. NA-10 variety was the fastest growing variety among all. Initial accelerated increase in fruit weight may be due to more natural occurring growth substances like auxins, gibberellins, cytokinin and others. The maximum fruit length (3.92 cm) was observed in variety NA-10 whereas the fruit smallest in length (3.44 cm) was observed in Laxmi variety. Fruit diameter increased with the growth of fruits (Table 2). The maximum fruit was observed in variety NA-5 was followed by NA-4. The smallest diameter was noted in NA-7.

**Table 1:** Physical composition of different aonla cultivars

Cultivars	Fruit weight (g)	Fruit length (cm)	Fruit diameter (cm)	Flesh content (%)	Seed content (%)
NA -4	43.56	3.84	4.21	34.86	0.17
NA -5	46.77	3.82	4.27	45.53	0.15
NA -6	38.03	3.74	4.01	30.27	0.16
NA-7	40.04	3.86	3.95	36.40	0.13
NA -10	37.85	3.92	4.15	34.03	0.11
Laxmi	42.58	3.44	4.09	38.75	0.10
Chakaiya	41.95	3.52	4.08	35.52	0.14
SEm ±	1.07	-	0.03	1.05	0.11
CD(0.05)	1.23	NS	0.15	1.27	0.31

Considerable fruit flesh content was found in later stages of fruit growth (Table 1). The maximum flesh content (45.53%) was observed in NA-5 variety. The minimum flesh content (34.03%) was recorded in NA-10 followed by NA-4 (34.86%). Regarding the seed content, it was maximum in

NA-4 (0.17%) followed by Laxmi (0.10%). It was interesting to note that, poor performance of NA-10 may be due to prevailing climatic condition of area of study as this cultivar prefers Gird regions of Madhya Pradesh.

**Table 2:** Chemical composition of different aonla cultivars

Cultivars	TSS (%)	Acidity (%)	TSS/Acid ratio	Ascorbic acid (mg/100g)	Fibre (%)
NA -4	12.17	1.85	6.58	618.59	1.47
NA -5	11.23	1.79	6.23	641.02	1.38
NA -6	11.12	1.80	6.17	638.29	0.86
NA -7	10.96	1.96	5.59	729.61	1.32
NA -10	10.14	1.83	5.54	627.72	1.30
Laxmi	12.67	1.98	6.39	653.18	1.41
Chakaiya	9.44	2.23	4.23	651.64	1.40
SE±	0.068	0.007	-	0.087	0.070
CD. (P=0.05)	0.159	0.016	-	0.203	0.162

### Chemical parameters

It was observed that the total soluble solid content in different cultivars of aonla has been presented in Table 2. It was maximum in Laxmi (12.67 %) followed by NA-4 (12.17 %) and lowest in Chakaiya (9.44 %). The acidity content in fruits of different cultivars (Table 2) was recorded maximum in Chakaiya variety (2.23 %) and minimum in NA-6 variety (1.80 %). Similarly, it was found that, the maximum TSS/ acid ratio was recorded in NA-4 variety (6.58) whereas the minimum was recorded in Chakaiya variety (4.23). The

ascorbic acid content was maximum in NA- 7 variety (729.61 mg 100<sup>-1</sup> g). The fibre content of the fruit was found in later stages of fruit growth. Initially there was no or very trace amount of fibre content was observed. The most fibrous variety was NA- 4 (1.41 %) followed by Laxmi. The least fibrous fruits were of NA-6 (0.86 %). This is in conformity with the findings of Singh *et al.*, (2004) [11].

### Acknowledgment

I would like to thanks all the technical, laboratory and field

staff that helped directly and indirectly in the formation of this manuscript. I would also like to thank the Vice chancellor, Dean of the College of Agriculture, HOD, Chairman and advisory committee and all the faculty members of RVSKVV, Gwalior for providing financial and technical help in the implementation of the experiment.

## References

1. AOAC. Official methods of analytical chemist, International, 17<sup>th</sup> ed. Washington DC 2000.
2. Balaji V, Prasad VM. Studies on value added kinnow – aonla blended ready to serve beverage. *J Food Process Technol* 2014;5:288.
3. Dachiya SP, Dhawan SS. Physico-chemical characteristics of Aonla (*Emblica officinalis* Gaertn.) Chakaiya. *Ind Fd Pack* 2001;55:133.
4. Jain S, Sankhla APK, Dashora A, Sankhla AK. Physico-chemical and sensory properties of orange drink. *J Food Sci Tech India* 2003;40:656-659.
5. Kumar M, Arya RK, Kumar M, Gaur RK, Sharma S. Evaluation of Aonla varieties under Semi-Arid conditions of Haryana. *Ekin J.* 2021;7(2):139-144.
6. Kumar R, Pathak S, Kumar AKU, Gautam DK. Studies on physico-chemical composition of aonla fruit (*Emblica officinalis* L.). *The Bioscan* 2016;11(4):2375-2377.
7. Nath V, Sharma RK. Screening of aonla (*emblica officinalis* Gaertn.) cultivars for processing. *Progressive Horticulture* 1998;30(1-2):76-77.
8. Praveen K, Khatkar BS. Physico-chemical properties and nutritional composition of aonla (*Emblica officinalis*) varieties: *International Food Research Journal* 2015;22(6):2358-2363.
9. Sahu S. Evaluation of physico-chemical characteristics of aonla fruits (*Emblica officinalis* Gaertn.) as a marketing strategies. *Indian Journal of Horticulture*, 2013;3:26-27.
10. Singh IS, Pathak RK. Evaluation of aonla (*Emblica officinalis* Gaertn.) varieties for processing. *Acta horticulture* 1987;208:173-177.
11. Singh V, Singh HK, Singh IS. Evaluation of aonla varieties for fruit processing. *Haryana J Hort. Sci* 2004;33:18-20
12. Tendon DK, Dikshit A, Kumar S, Shukla DK. Evaluation of aonla varieties for preparation of segments-in-syrup. *Bev Food World* 2006;33(12):63-64.
13. Thakur NS, Nancy Thakur, Abhimanyu Thakur, Pradeep Kumar, Hamid. Physico-chemical characteristics and standardization of juice extraction method from wild aonla (*Phyllanthus emblica* L.,) fruits of Himachal Pradesh, India. *Int. J Curr. Microbial. App. Sci.* 2018;7(2):731-737.